**Internet Protocol version 4** (**IPv4**) is the fourth revision in the development of the [Internet Protocol](http://en.wikipedia.org/wiki/Internet_Protocol) (IP) and the first version of the protocol to be widely deployed. Together with [IPv6](http://en.wikipedia.org/wiki/IPv6), it is at the core of standards-based internetworking methods of the [Internet](http://en.wikipedia.org/wiki/Internet). IPv4 is still by far the most widely deployed [Internet Layer](http://en.wikipedia.org/wiki/Internet_Layer) protocol (As of 2011, [IPv6 deployment](http://en.wikipedia.org/wiki/IPv6_deployment) is still in its infancy).

IPv4 is described in [IETF](http://en.wikipedia.org/wiki/IETF) publication [RFC 791](http://tools.ietf.org/html/rfc791) (September 1981), replacing an earlier definition ([RFC 760](http://tools.ietf.org/html/rfc760), January 1980).

IPv4 is a connectionless protocol for use on [packet-switched](http://en.wikipedia.org/wiki/Packet-switched" \o "Packet-switched) [Link Layer](http://en.wikipedia.org/wiki/Link_Layer) networks (e.g., [Ethernet](http://en.wikipedia.org/wiki/Ethernet)). It operates on a [best effort delivery](http://en.wikipedia.org/wiki/Best_effort_delivery" \o "Best effort delivery) model, in that it does not guarantee delivery, nor does it assure proper sequencing or avoidance of duplicate delivery. These aspects, including data integrity, are addressed by an [upper layer](http://en.wikipedia.org/wiki/Upper_layer_protocol" \o "Upper layer protocol) transport protocol , such as the [Transmission Control Protocol](http://en.wikipedia.org/wiki/Transmission_Control_Protocol" \o "Transmission Control Protocol) (TCP).

Addressing

IPv4 uses 32-[bit](http://en.wikipedia.org/wiki/Bit) (four-[byte](http://en.wikipedia.org/wiki/Byte)) addresses, which limits the [address space](http://en.wikipedia.org/wiki/Address_space" \o "Address space) to 4294967296 (232) addresses. However, some address blocks are reserved for special purposes such as [private networks](http://en.wikipedia.org/wiki/Private_network" \o "Private network) (~18 million addresses) and [multicast](http://en.wikipedia.org/wiki/Multicast" \o "Multicast) addresses (~270 million addresses). This reduces the number of addresses that may be allocated for routing on the public Internet. As addresses are assigned to end users, an [IPv4 address shortage](http://en.wikipedia.org/wiki/IPv4_address_exhaustion) has been developing. Network addressing changes by [classful network](http://en.wikipedia.org/wiki/Classful_network" \o "Classful network) design, [Classless Inter-Domain Routing](http://en.wikipedia.org/wiki/Classless_Inter-Domain_Routing" \o "Classless Inter-Domain Routing), and[network address translation](http://en.wikipedia.org/wiki/Network_address_translation) (NAT) have contributed to delay significantly the inevitable exhaustion which occurred on February 3, 2011 when IANA allocated the last five blocks to the five [regional Internet registries](http://en.wikipedia.org/wiki/Regional_Internet_registries" \o "Regional Internet registries) (RIRs).

This limitation stimulated the development of [IPv6](http://en.wikipedia.org/wiki/IPv6) in the 1990s, which has been in commercial deployment since 2006.

[[edit](http://en.wikipedia.org/w/index.php?title=IPv4&action=edit&section=2" \o "Edit section: Address representations)]**Address representations**

IPv4 addresses may be written in any notation expressing a 32-bit integer value, but for human convenience, they are most often written in[dot-decimal notation](http://en.wikipedia.org/wiki/Dot-decimal_notation), which consists of four octets of the address expressed individually in [decimal](http://en.wikipedia.org/wiki/Decimal" \o "Decimal) and separated by periods.

The following table shows several representation formats: